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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,892	12/26/2006	Mark Anthony Darty	501014.20004	9574
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REED SMITH LLP P.O. BOX 488 (NYC) PITTSBURGH, PA 15230-0488			EXAMINER WILLIAMS, JAMEL	
			ART UNIT 2855	PAPER NUMBER
			NOTIFICATION DATE 09/01/2011	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptoipinbox@reedsmith.com

Office Action Summary**Application No.**

10/553,892

Applicant(s)

DARTY ET AL.

Examiner

JAMEL WILLIAMS

Art Unit

2855

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-72 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-5, 7-19, 22-42 and 44-72 is/are rejected.
- 8) ☒ Claim(s) 6, 20, 21 and 43 is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-650)
Paper No(s)/Mail Date ____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 7-11, 16-19, 22-42, 44-48, 51-62, and 66-70, 71 and 72 are rejected under 35 U.S.C. 102(b) as being anticipated by Kang et al. (U.S Patent No. 6,132,278 hereafter referred to as Kang).

Regarding claims 1-3, 23, 38-40, 55, 56, 59, and 69, Kang teaches a sensing apparatus such as a pressure sensor or an accelerometer comprising a nanostructure (figure 24: 25, 30) suitable for emitting electrons; and, a collector (figure 24: 35) proximately positioned with respect to the nanostructure (25, 30) so as to receive emitted electrons and define a gap (figure 24: 38) there between partially dependent upon an applied force (see figure 24, d); wherein, said emission and reception of said emission and reception of said electrons is indicative of said applied force (column 17, lines 57-59).

Kang further teaches a nanostructure and a collector adapted to have an electrical potential applied there-across, as well as across said gap (see figure 24, “V”).

Additionally regarding claims 55, and 59, Kang further teaches a nanostructure (fig. 29: 25) suitable for emitting electrons in response to application of potential; and a collector 35 positioned with respect to said nanostructure to sense emitted electrons upon application of potential; wherein the nanostructure is displaceable with respect to the collector and the displacement is indicative of acceleration (column 18, lines 31-38).

Regarding claims 4, 5, 22, 41, 42, 51, 57 and 58, Kang further teaches a nanostructure and collector operable in the first mode in the first state, corresponding to a cutoff region for emissions and a second mode in the second state, corresponding to substantially potential and gap dependent emissions, wherein the gap is configured such that there is substantially no field emission in an absence of an applied force (see figure 18).

Regarding claim 7, 44, and 59, Kang further teaches a nanostructure comprising one or more carbon nanotubes suitable for emitting electrons when electrically excited (column 6, lines 33-35; figure 7B).

Regarding claim 8, 45, and 60, Kang further teaches a nanostructure comprising one film 20 suitable for emitting electrons when electrically excited.

Regarding claims 9, 10, 46, 47, and 61-62, Kang further teaches a nanostructure comprising at least one self aligned carbon nanotube, as well as an array of self aligned carbon nanotubes (See figures 7b and 45). The prior art additionally teaches inherently at least one carbon nanotube has ends affixed to at least one substrate.

Regarding claim 11 and 48, Kang further teaches a portion of said nanostructure is adapted to be displaced in response to said applied force (see figure 24, Pressure and d).

Regarding claim 16 and 66, Kang further teaches nanostructure further comprising hydrogen (column 8, lines 38-41).

Regarding claim 17 and 67, Kang further teaches a current sensor electrically coupled to a collector which detects a current indicative of emission and collection (see figure 24, A).

Regarding claim 18 and 68, Kang teaches an apparatus comprising a plurality of collectors 35 each being proximately positioned with respect to said nanostructure so as to receive said emitted electrons (see figures 14, 32).

Regarding claim 19 and 54, Kang further teaches a current sensor electrically coupled to each said collector and for detecting at least one current being indicative of said emission and collection (see figure 24, A; and 32).

Regarding claim 24 and 52, Knag further teaches the electrical potential across said gap to be substantially constant (see figure 24, voltage does not change between elements 39).

Regarding claim 25, 26, and 27, figure 27 shows the nanostructure and collector 35 physically coupled by a support 40, to be in a substantial vacuum chamber, wherein the gap is dependant upon the deflectable member 35 moving toward or away from the emitter (column 18, lines 21-24).

Regarding claims 28- 31, Kang further teaches the apparatus of claim 27, further comprising a proof mass 42 mechanically coupled to member 35. Additionally Kang teaches that the nanostructure and/or the flexible member 35 can be supported in a cantilevered manner (column 17, lines 55-56); also the member 35 can be simply supported by and/or fixedly coupled to a support 40 as shown in figure 30.

Regarding claim 32-34, Kang further teaches the apparatus of claim 26, further comprising a beam 45, and a deflectable membrane 35 suitable for deflecting in response to a pressure applied thereto.

Regarding claim 35, Kang teaches pressure acting as the applied force against the flexible member, (see figure 24).

Additionally, as stated above, the flexible member can be either the substrate attached to the nanostructure or the collector. Flexible member 35 moves toward or away from emitter in response to applied pressure (column 18, lines 21-24).

Regarding claims 36 and 37, Kang further teaches gas exerting said applied pressure (column 18, lines 61-62) regarding a chamber 38.

Regarding claim 53, Kang further teaches pressure deflecting membrane supporting the collector (see figure 24).

Regarding claim 55, Kang further teaches a nanostructure (fig. 29: 25) suitable for emitting electrons in response to application of potential; and a collector 35 positioned with respect to said nanostructure to sense emitted electrons upon application of potential; wherein the nanostructure is displaceable with respect to the collector and the displacement is indicative of acceleration (column 18, lines 31-38).

Regarding claim 70, Kang further teaches the device of claim 69, further comprising an excitation pad 33 electrically coupled to at least over of said plurality of nanostructures (See figures 44, 45)

Regarding claims 71 and 72, Kang teaches an apparatus comprising a plurality of collectors 35 each being proximately positioned with respect to said nanostructure so as to receive said emitted electrons (see figures 14, 32). He further teaches a current sensor electrically coupled to each said collector and for detecting at least one current being indicative of said emission and collection (see figure 24, A; and 32).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12- 15, 49, 50, and 63- 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang.

Regarding claims 12, 13- 15, 49, 50, and 63- 65, Kang further teaches a nanostructure providing a proof mass 42 for sensing said applied force (see figure 30).

Additionally regarding claim 13, Kang discloses the claimed invention except for the actual collector providing the mass. It would have been obvious matter of design choice to have the collector provide the mass. Kang teaches that the mass 42 is added to provide enhanced movement, which would imply that the collector 35 possesses some undisclosed weight. Furthermore applicant has not disclosed that having the collector itself provide said mass solves any stated problem or is for any particular purpose and it appears that the invention would perform actually well with element 42.

Figure 8b teaches an array of diamond micro-tip conical emitter structures on a substrate 30.

Additionally regarding claim 15 and 65, it is well known in the art that the weight of element 35 is increased by molecular absorption.

Allowable Subject Matter

Claims 6, 20, 21, and 43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not discuss a third mode corresponding to a saturation region for emissions, nor does it teach the nature of detection of emissions in regards to the collector.

Response to Arguments

Applicant's arguments filed 07/20/2011 have been fully considered but they are not persuasive. Applicant is asserting that the Kang reference is teaching microstructures and not nanostructures. However, Column 11, lines 1-30, clearly teaches an emitter with a radius at the tip 26 of less than 200 Å, or 20 nanometers. Kang additionally teaches that the radius of tip 26 of emitter 25 can be sharpened to the nanometer range. Regarding silence as to claim 69, the fact that the emitter is emitting electrons suggests there is a bias placed across a sensor and nanostructure. A voltage applied to the emitter was believed to be inherently taught in the reference. Additional support can be found in column 13, line 45 and column 14, lines 8-13.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMEL WILLIAMS whose telephone number is (571)270-7027. The examiner can normally be reached on 9:30am- 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lisa Caputo can be reached on (571)272- 2388. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. W./
Examiner, Art Unit 2855

*/Lisa M. Caputo/
Supervisory Patent Examiner, Art Unit 2855*